a solution be made in water, all the tests characteristic of copper may be used, with the certainty of a correct result.

They totally dissent from the opinion that either copper or lead exists in the human body in its healthy condition. They are confirmed in this by direct analysis, and also by a physiological experiment.

During the nine months that they were engaged in their investigations on this metal, they mixed daily, with the food of a dog, sometimes sulphate and sometimes acetate of copper. The dose was gradually increased, and the animal finally took, without any injury to his health, ten centigrammes daily, so that the whole swallowed, during 263 days, was not less than twenty-five grammes, (about seven drachms.) During life no trace of copper could be detected in the urine, and when killed none was found either in the bones, muscles, or viscera.

Our authors also claim to have discovered a peculiar symptom, viz., salivation or a copious bronchial secretion, which ordinarily occurs in a few hours after the poisoning, and which is evidently the mode in which the system frees itself, in the same manner as the kidneys eliminate arsenic and antimony. They detected the poison in this fluid, after having in vain long sought for it in the urine. When the secretion ceased, the animal swallowed, with its saliva, the fluid of the bronchial respiration, and then they detected the copper in the intestinal excretions.

This difference in the mode in which nature acts to expel the poison, leads MM. Danger and Flandin to suggest various modifications in the treatment of cases of poisoning by copper. Commence with chemical neutralizers, as iron filings, sulphuric lemonade, and emeto-cathartics; then general and diffusible stimulants, sudorifics and vapour baths, and finally, employ the remedies indicated to remove local inflammation.

As to other poisons, chloride of gold passes off in much larger quantity by the kidneys than by the lungs; while it is directly the opposite with chloride of silver. Of the poisons that pass most readily by the kidneys, antimony has the first place, next gold, arsenic, silver. Copper is certainly at the foot of the list, and they doubt whether it should not be altogether excluded, since the organs of the renal secretion appear to be impenetrable to it.

After death, it is exclusively in the intestinal canal and the liver that we can detect the presence of copper. From an ounce and a half to two ounces of the latter viscus, contain sufficient for the most decisive judicial proofs.—*Royal Academy of Sciences of Paris*, Meeting of July 24, 1843. T. R. B.

76. *Medico-legal Observations on Foot Prints.*—M. Mascart presented a paper on this curious subject to the Royal Academy of Medicine of Belgium. We gather the following as to its contents from the report of M. Delahaye. Inquiries on this point have usually been left to magistrates, although it is strictly a subject (but neglected) belonging to the medical jurist.

After some remarks on the conformation of the plantar surface, covered either with a shoe or boot, and on the mechanism of walking in man, and the application of the foot to the ground, M. Mascart asserts that, owing to various causes, the foot-print on the ground is generally smaller than the foot which has made it. If this be so, many serious errors must have been made formerly, since the prevailing opinion is, that they should exactly correspond.

The author ascribes this shortening principally to one of three causes: the consistence of the soil to which the foot is applied, the shape of the foot, or of the boot or shoe covering it, or lastly, the manner in which the foot was placed in walking. He enters into details, satisfactorily illustrating all of these.

He allows, however, that this result is not invariable, and this may occur from the peculiar shape of the shoe, boot, or slipper, or from the depth to which the foot has gone. The reporter suggests that there may be instances in which the foot-print will be even larger than the foot itself. Thus, when walking on a light soil, the point of the foot in its forward motion may throw before it so much of the ground as to enlarge the front of the point. The foot, in walking, is not applied perpendicularly, but from behind, forwards or downwards. Hence, a

certain quantity of the ground is carried along with it, and, on measuring the mark, it has, under such circumstances, been ascertained, to be some lines longer than the sole of the boot.

M. Mascart is continuing his investigations of this subject.—*Bulletin de l'Academie Royale de Médecine de Belge*, November, 1843.

77. *Chossat on Starvation.*—The experimental researches of this author obtained for him the gold medal for Experimental Physiology in 1841, from the Royal Academy of Sciences of Paris. His Memoirs, published in 1843, contains numerous facts and important inferences bearing on physiology, pathology, and therapeutics. I shall, however, confine myself to those which immediately concern the subject of legal medicine.

M. Chossat's experiments were made on pigeons, turtle-doves, common fowls, guinea pigs, rabbits, and several of the cold-blooded animals, as frogs, tortoises, serpents, &c.

Forty-eight warm-blooded animals of all the species were totally deprived of food and drink, and the first important point ascertained was the constant but gradual diminution of weight. If the loss of the first day be abstracted, the loss of weight till towards the close of life was nearly the same each day. The first day always exhibited a greater amount of loss, in consequence of the bowels evacuating the remains of the last food. All things being otherwise equal, and taking a period equally distant from the hour at which inanition began, the loss was great in proportion to the bulk of the body. Towards the end of life, an increased amount of diurnal loss in weight was observed—a circumstance attributable to the increased amount of alvine evacuations, or even smart diarrhœa, which often then occurred.

One of the most interesting points ascertained by M. Chossat was the absolute average amount of weight lost before death took place. The average result of all his experiments, whether with fat or lean animals, showed that before death ensued the weight of the body was reduced four-tenths of what it had been when they were shut up to be starved. And when this occurs death ensues. But it may be modified by circumstances. Thus, if the animal be loaded with fat, it sometimes lives till it has lost five-tenths, or one-half, of its weight. Age, also, exerts a powerful modifying influence. Very young animals often die after losing only two-tenths of their weight, and the loss in them never exceeds four-tenths.

The time which an animal, deprived of all sustenance, will live, varies much. In birds and mammalia, the average duration of life under starvation was nine days. The maximum, however, was twenty days and a half, and the minimum was a little more than two days. Here, again, age exerted a powerful modifying influence. In very young animals death occurred by the end of the second day, while, in adult animals, the average duration of life was from fifteen to eighteen days. It is, however, a remarkable circumstance that the longer life was prolonged, or to be prolonged, the less was the amount of daily loss, and the sooner death occurred, the more rapid was the diurnal loss of weight.

In the case of reptiles and fishes, the experiments proved that they died when they had lost the same proportional amount of weight as the birds and quadrupeds. They lived, however, much longer, as their nutritive movement is much slower. In general, they lived twenty-three times as long again.

The next series of experiments, undertaken by M. Chossat, was conducted on the principle of allowing a very insufficient quantity of food. For some animals there was given a very limited supply of both food and drink; to others, insufficient solid food alone; and to a third, water only.

In the first series it was singular to remark, that, when they died, their loss of weight was found to be very nearly the same as if they had been totally deprived of food. The duration of life was, however, nearly double.

A supply of water seemed to prolong life in reptiles, and somewhat lengthened it in quadrupeds, but had no influence on that of birds. The water, how-